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FROM TICKING TO CLICKING: CHANGES IN AUDITING TECHNIQUES IN BRITAIN FROM THE 19th CENTURY TO THE PRESENT

Abstract: The purpose of this article is to detail and explain the changes in auditing techniques that have taken place in Britain since the Victorian era, an area of study hitherto neglected by accounting historians. In so doing, it is hoped that an increasing knowledge of past practices will put the current processes into context. The source material for the paper includes new evidence from a program of oral history and postal questionnaires, together with more traditional sources such as the trade journals and textbooks. The so-called bookkeeping audit of vouching and checking postings and castings, and with the auditor also doing a fair proportion of the client's accounting, was typical down to the 1960s. Major changes then took place, including a decline in accounting work, an increased focus on the balance sheet, and a reliance on sampling and the systems approach. This trend is explained by a growth in the size and professionalism of audit clients. Further change since the 1980s reflects the use of risk assessment, materiality, and analytical review and may be ascribed to the growing commercial pressures on auditors.

INTRODUCTION

With the collapse of Enron and WorldCom, together with their auditors, Arthur Andersen, auditing today is clearly the most controversial aspect of the accountant's work [*Economist*, November 30, 2002]. The American scandals were, of course, presaged by equally dramatic upheavals in the audit world in Britain, particularly in the late 1980s and early 1990s. Indeed, audit failures in Britain are as old as auditing itself [Mitchell et al., 1993]. Yet, the growth of the British accountancy profession and the world-wide success of its accountancy firms were to a large extent based on the audit function [Matthews et al., 1997]. In view of this prominence then, it is remarkable how little interest auditing has received from accounting historians. In particular, there has been almost no attention to how, historically, auditors conducted their work [Lee, 1988, p. xi; Matthews, 2002].

This article is intended to close this gap in our knowledge. Of course, it would be impossible in an article of this length to cover all the detail of change so that a broad-brush approach has been taken of necessity. Within these limits, the purpose of the article is to establish the salient developments in auditing, the broad timing of change, and, crucially, the causes. Unfortunately in the latter regard, there is little helpful sociological or economic theory of technical change in a profession, unlike the mass of theorizing on technological innovation in manufacturing [e.g., Freeman and Soete, 1997]. There has been some discussion regarding innovation in the service sector; for example, Podolski [1986] and Silber [1983, pp. 89-95] in U.S. financial services, and Pearson [1997], who analyzed change in the British insurance industry. However, these do not amount to useful theory as such since they focus almost exclusively on product innovation, whereas the history of auditing change is one of process. We are left therefore in this article to look pragmatically for the main drivers of historical change in the hope that the answers will inform debate on current auditing issues. As Millichamp [2002, p. 191] has argued in his audit textbook: "The study of the history of a subject will often illuminate its present condition." To know where we are or where we are going, it is important to understand from whence we have come.

The source material for this article is largely based on the data generated by a project, funded by the Institute of Chartered Accountants in England and Wales (ICAEW), which used oral history and postal questionnaire techniques to gather information on all aspects of the auditor's life and work. Interviews were carried out with 77 retired or practicing chartered accountants. They included past and current leaders of the profession, while others were selected to provide a good cross-section of experience in large and small firms with a good geographical spread. Included also were some older interviewees in order to gain perspectives on the earliest possible times; in fact, some respondents started practicing in the 1920s. All interviewees were closely questioned on the audit methods they used and the changes they saw during their careers. Discussion of the methodology of the oral history part of the project and the successes and problems encountered, together with edited interviews and brief biographies of the respondents, have been published by Matthews and Pirie [2001, see also, Matthews, 2000]. Full transcripts are available from the author with permission from the interviewee.

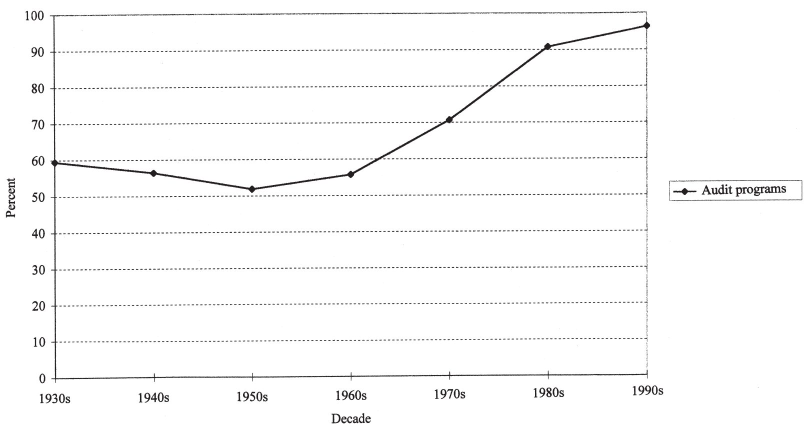
TABLE 1

Data Taken from a Postal Questionnaire to ICAEW Members

Year of qualification	1920s and 1930s	1940s	1950s	1960s	1970s	1980s	1990s	Total
Total sample	300	300	300	300	300	300	300	2100
Response rate (%)	32.7	48.0	54.3	49.0	43.7	40.0	39.2	45.0
Replied "always" or "often" to question on the use of audit programs (%)	59.5	56.5	51.9	55.8	70.8	90.5	96.4	

FIGURE 1

Use of Audit Programs



Source: Postal questionnaire, see text.
Notes: The graph represents the percentage of respondents who replied that they "always" or "often" used audit programs during their training, respondents being grouped into the decade in which they trained.

The postal questionnaire was a pioneering project in accounting history. An extensive discussion of the methodology has appeared in a recent article [Matthews, 2002], and tables of the complete data will be published in book form shortly [Matthews, 2006]. Briefly, questionnaires were mailed out to a random sample of ICAEW members who, as can be seen from Table 1, were grouped into cohorts depending on their decade of qualification. The questions on audit techniques were then directed to the respondents' period of training as the most likely time when they were performing audit work, allowing for matching audit practice to specific decades. For example, respondents were asked to tick whether they used audit programs during their training, "always," "often," "sometimes," or "never." The combined percentage replying "always" or "often" for each decennial cohort is set out in Table 1 and graphed in Figure 1, clearly revealing the historical trends in the use of audit programs. In addition, since two questions asked were for the name of the firm with which the respondents qualified and the type of company they mainly audited, any influence these factors might have had on the techniques used can be judged. There was usually a clear impact, as illustrated in Table 2, where, for example, 89.8% of all the respondents who mainly audited quoted companies said they used audit programs "always" or "often," whereas only 64.6% of those who mainly audited non-quoted companies gave that response.

TABLE 2

Responses to a Postal Questionnaire

(N = 945)				
Respondent replied that during their training their firm ...	Respondent mainly audited quoted companies	Respondent mainly audited non-quoted companies	Respondent trained with a top-20 audit firm	Respondent trained with an audit firm outside the top 20
	%	%	%	%
drew up the client's accounts "frequently"	20.6	54.4	33.4	57.4
used audit programs "always" or "often"	89.8	64.6	77.7	64.5
used statistical sampling "always" or "often"	50.8	23.1	44.8	20.0
audited the client's internal control systems "always" or "often"	66.4	25.5	46.8	24.0
sent out management letters "always" or "often"	68.5	35.5	56.8	30.1
attended stocktaking "always" or "often"	78.0	55.2	62.4	42.7
circularized debtors "always" or "often"	68.8	35.7	54.5	38.1

Source: Top-20 auditing firms determined from data as in Matthews et al. [1998, Table 5, pp. 46-47].

Another source used here is a survey (funded by the Leverhulme Trust) of company reports dating from the late 19th century, where, for example, audit fees and the wording of audit reports also cast light on the amount and nature of audit work undertaken. The final primary source was a search of the archive of past examination papers held at ICAEW headquarters which identified when questions on particular techniques first appeared in the final audit examinations, giving some further indication of the timing of their rise to importance.

The more traditional documentary sources, principally the trade press and contemporary textbooks, were also used. It could be argued with justification that audit textbooks in particular should not be relied upon as authoritative sources of current procedures; they may be ahead of practice, or since they are updated irregularly, more often they might lag behind. With this in mind, the author has always attempted where possible to corroborate textbook evidence with other sources. Where this has not been possible, the reader should be on guard.

The article is set out chronologically, starting with a discussion of the initial bookkeeping audit, and then looking at the changes that accelerated in the 1960s, followed by a section on the impact of the computer, then one detailing the changes from 1980 down to the present day more or less. A summary of the findings concludes the article.

THE BOOKKEEPING AUDIT

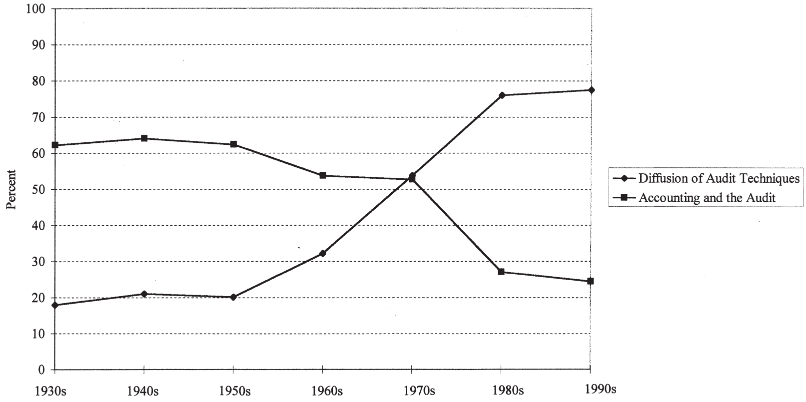
The Bookkeeping Audit and Accounting: The most significant feature of the traditional British bookkeeping audit is that it was closely bound up with also doing the client's accounting. Although accounting historians like Jones [1981, p. 54] have been aware of this fact, the extent of the practice and its longevity, not to say its full implications, have been largely overlooked by historians, perhaps because the Companies Acts and the audit textbooks all made a clear distinction between the directors' responsibility to produce a balance sheet and the auditors' job to give an opinion on it [de Paula, 1914, pp. 2-3; Spicer and Pegler, 1914, p. 196; Edwards and Webb, 1985, p. 177]. However, many articles in the *Accountant* in the 1880s and 1890s indicate the accounting role of the auditor. For example, the senior partner in probably the largest practice in Birmingham commented: "In this district it is frequently left to the auditor to balance the books himself, and he is even required sometimes to write up the Private Ledger" [quoted in Chandler and Edwards, 1994, pp.

157, 159]. Of the 26 court cases between 1887 and 1936 reported in Dicksee's textbook where the audit process is made clear, in 19, almost three-quarters of them, the auditor drew up the final accounts. Indeed, in the well-known case of the London and General Bank in 1895, the judge was explicit (if in error) on the matter: "Mr Theobold's duty as auditor was confined to framing the balance sheets" [*London Times*, August 7, 1895, p. 5; Waldron, 1969, p. 780]. Most accountants interviewed in the ICAEW project also attest to the symbiosis of accounting and the audit, and, indeed, that clients would often see drawing up the accounts as the role of the audit [e.g., interviews with Chapman, Fabes, and Goodwin]. Our postal questionnaire also revealed that about two-thirds of respondents who qualified between the 1920s and the 1950s said that during their training, their firm drew up their clients' accounts "frequently" (see Figure 2). As late as the 1960s, 38% of those mainly auditing quoted companies said they did so.

The reasons for this characteristic of the early audit are not difficult to find since the typical audit clients in Britain were small (or even not so small) family firms. These so-called private companies were by far the British auditors' largest market [Matthews et al., 1998, p. 245]. Chandler and others have detailed the managerial amateurishness of these family-run companies

FIGURE 2

Diffusion of Audit Tecniques and Accounting and the Audit



Source: Postal questionnaire, see text.
Notes: The diffusion of techniques is an average of the combined responses illustrated in figures 1-6. Accounting and the Audit is the percentage of responses to a question indicating that the respondents "frequently" drew up the accounts of their clients while conducting an audit at the start of their career.

in Britain [Chandler, 1990, pp. 242, 266; Keeble, 1992]. Indeed, even quite large quoted companies often had non-existent or underdeveloped accounting departments [Reader, 1976, p. 144; Chandler, 1990, p. 68], while internal audits only became common in the 1960s [Hill, 1979, p. 12; Chambers, 1981, p. 21; Chandler and Edwards, 1994, p. 85; interviews with Brittain, Grenside, and Hewitt]. It has been estimated that as late as 1951, there was only approximately one qualified accountant on average working in business per public company in Britain, with only one in four of these being a chartered accountant, while there were still merely 2.5 per company in 1971 [Matthews et al., 1998, p. 90]. The reason British auditors did their clients' accounting therefore was that the majority did not have the personnel to do the work themselves [interviews with Colvin and Partridge].

Ticking and Bashing: The major result of the auditors' accounting function was that, if British auditors were making up the books for their clients, their auditing work had to focus on transactions. Where possible, they had to check everything to guarantee the arithmetic accuracy of the figures and ensure that the books balanced.

Nonetheless, an audit had to be conducted alongside the accounting work, and the techniques of the external company audit undertaken by professional accountants, as opposed to the early amateur shareholder auditors, were probably well established by at least the first half of the 19th century. Quilter, a leading accountant of the day, when questioned on his role as an auditor by a House of Lords Select Committee on railway audits in 1849, described an audit process which would have been familiar to auditors a century later [Parker, 1986, p. 29; Kitchen, 1988, pp. 26-29]. This traditional, so-called bookkeeping audit, however, is hazardous to describe since the work varied depending on the size and nature of the client's business and from one accounting firm to the next. Spicer and Pegler's [1914, p. xiv] textbook discussed in detail 37 different classes of audit, ranging from railways to social clubs which they considered needed special consideration. On the other hand, fundamentally, the bookkeeping audit probably went through a process which was common to most audits and was the standard procedure described in the textbooks.

A first audit, of course, would start with a review of the bookkeeping system used by the client. Once this was established, the work typically consisted of first closing off the books of account, reconciling the cash book and the bank statements, then checking the posting (transferring) of figures from one account book or ledger to another, vouching (verifying) transactions with documentary evidence such as invoices, and casting (totaling) the columns of figures in the books. This process was highly labor intensive, usually performed by trainee articled clerks, and was by all accounts unpleasant work, involving, "going out with a team usually in pairs, where one sat with the ledger, and calling out enormous numbers of entries over to each other, trying hard not to fall asleep" [interview with Venning]. An auditor of the 1940s remembered: "In those days it was all hand-written stuff and the whole essence of the audit was the ticking of every single item you could find in the books. Everything was ticked at least once. It was ticked twice; in front for a posting and behind for a voucher. It was ticked three times for anything in the cash book, in front for a posting, behind for a voucher and underneath for a check to the bank pass book" [interview with Livesey]. Also, clerks would have individual stamps, often using different colored ink, to identify who had done the checking [interviews with Chapman and Fabes]. Thus, the mind-numbing work was known affectionately or otherwise as "ticking and bashing" [interviews with Aspell, Atkinson, Boothman, Sims, and Whinney]. Many interviewees emphasized how it "was based on arithmetical accuracy which was the great key to it all" [interview with Shaw]. Did the books balance? If they did not, "one searched for mistakes of a penny, believe it or not" [interview with Middleton]. Again to this point, "the most important thing was you had to cast quicker than any client…it was considered a great disgrace if you couldn't add up quicker than the chief clerk" [interview with Jones].

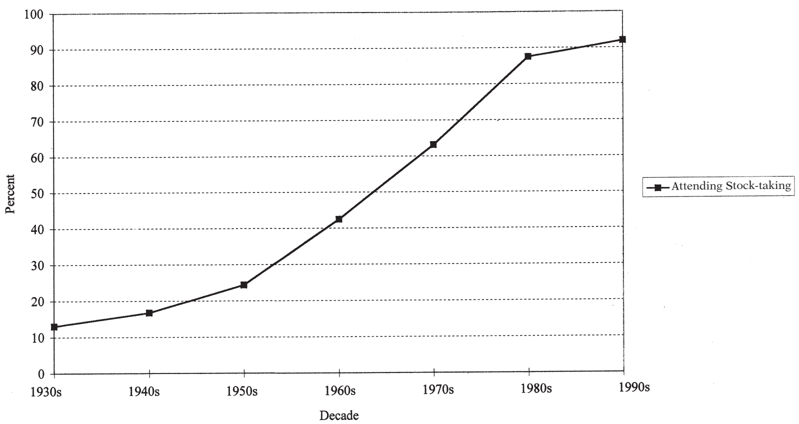
Some historians like Chandler [1997, p. 70] and Edwards [1989, p. 196; see also, Chandler et al., 1993, p. 448] have tended to side with contemporary critics that the bookkeeping audit was a "mechanical," superficial affair. However, although the audit ran through a fairly mechanical set of procedures, this did not equate with its being brief or cursory. The amount of work being done in the early audits was assessed from a sample of 23 company reports for the early 1880s, where the mean time lapse between a company's accounting year-end and the date of the audit report, together with the level of audit fees, using an estimated two guineas a day charge-out fee [Pixley, 1910, p. 38; Jones, 1995, p. 59; Edwards et al., 1997, pp. 17-21), produced an estimate of about four staff working for two months on the average audit of quoted companies. This estimate is confirmed by our interviews [with Atkins, Boothman, Milne, Mold, Wilde, and Wilkes]. Also, from the beginning of the professional audit, some interim work prior to the financial year-end was performed, which adds to our estimates of typical audit effort [de Paula, 1914, p. 15; Spicer and Pegler, 1914, p. 25; interviews with Atkinson, Chapman, Haddleton, and Mold].

The Balance Sheet: Overwhelmingly the most hours of a typical bookkeeping audit were employed in checking the accuracy of the recording of transactions. The valuation and verification of balance sheet items was much less time-consuming because there was very little physical checking, and auditors were usually prepared to take the word of management on such matters as value [Littleton, 1981, p. 312]. However, the main diversity of audit practice occurred because some clients were large and professionally managed enough to have accounts departments capable of handing the auditor a completed set of accounts, the accuracy of which they then checked (in other words, the statutory and textbook meaning of an audit). These were called "pure" audits. Early auditors realized that checking transactions on these audits was both more difficult (because of the scale of the client's operations) and less important than verifying balance sheet items. In 1888, an accountant argued: "Take the case of a bank, what are we to do there? We must limit our examinations very much to the balance sheet" [quoted in Chandler and Edwards, 1994, p. 87]. A Price Waterhouse partner interviewed recalled of the 1950s that the audit "would have been quite focused on the balance sheet. The broad underlying theory being that, if you get two balance sheets right, the difference between the two would show up in the profit and loss account. So rather than audit the profit and loss account to death we concentrated on making sure the balance sheet was right" [interview with Stacy].

However, even on pure audits, the early British auditors rarely went beyond their clients' books and paperwork, certainly not doing the physical checking and valuation of stock. After 1896, they could point to the judgment in the Kingston Cotton Mill case, which held that the auditor "is entitled to rely upon the representation of responsible officials" [Spicer and Pegler, 1914, p. 174]. Of course, the textbooks still recommended that the auditor should ascertain that the stock-taking was adequately done, and should cast the stock-sheets and test the valuations [Dicksee, 1904, p. 215; Spicer and Pegler, 1914, p. 175]. But auditors made the point many times that they were not technically qualified to evaluate stock; therefore, they had to rely on management's written or verbal assurances. It was commonly stated that they had done so in their audit reports [*Accountant*, April 11, 1936, p. 576]. But, on occasions, auditors did attend a client's stock-taking; indeed, some did the stock-taking for the client [interview with Sanders]. As Figure 3 reveals, approximately 13% of respondents to our postal questionnaire stated their firms always or often attended stock-taking even in the interwar period. Yet, although the practice was on the increase, only a quarter did so in the 1950s. Again, there was a wide variety of procedure; some firms attended stock-takes as a matter of routine while others never attended [interviews with Boothman, Davies, Fabes, and Patient].

FIGURE 3

Attendance at Stock-taking



Source: Postal questionnaire, see text.
Notes: The graph represents the percentage of respondents who replied that they "always" or "often" attended stocktaking during their training, respondents being grouped into the decade in which they trained.

Nor did the assessment of debt usually involve the auditors in more than a look at the client's documents and taking its assurances. Various articles in the *Accountant* in the 1890s had argued for the circularization of debtors, but the practice was not generally taken up [Chandler and Edwards, 1994, pp. 111, 144, 154]. Reference to the practice did appear in the fourth edition of Spicer and Pegler [1925, p. 569], and an article in 1926 noted: "Now, it is a recognised practice with professional auditors to circularise debtors…the procedure provides such a safeguard as cannot lightly be ignored by the auditor" [*Accountant*, November 27, 1926, pp. 738-739]. This assertion, however, provoked a fierce response: "I deal with businesses where the number of accounts runs into thousands. Who bears the costs of circularisation?" [*Accountant*, December 2, 1926, p. 806]. Figure 4 confirms that circularization was practiced in the interwar period although it was a minority activity. Our interviews again confirm the wide diversity of experience [interviews with Ainger, Burgess, Carter, Chapman, Edey, Keel, and Passmore].

FIGURE 4

Use of Debtor Circularization

Source: Postal questionnaire, see text.
Notes: The graph represents the percentage of respondents who replied that they "always" or "often" circularized debtors during their training, respondents being grouped into the decade in which they trained.

Audit Documentation: Another aspect in which the early audit procedures differed between firms was the extent to which the work was pre-planned and written down in an audit program. From at least the late 19th century, it was the practice of many firms to use audit notebooks "as a record of routine work performed and of queries raised in the course of an audit" [Dicksee, 1892, pp. 1-2]. The chief motive behind the programs in the audit notebooks was the control of the audit clerks: "In a large practice, unless some such method is adopted, the principals must of necessity lose a very large amount of control, and will be very much in the hands of their staff" [de Paula, 1917, p. 12; also see, Dicksee, 1904, p. 5]. An auditor described in 1889 how the audit book for each audit had "columns for the initials of each person who has performed the work, and made himself responsible for its having been correctly and thoroughly done. By this means, much labour is saved on a second audit and thorough continuity secured" [quoted in Chandler and Edwards, 1994, p. 110]. The term "audit programme" was of slightly later provenance. Spicer and Pegler [1910] published a book of model "audit programmes," each especially tailored for a wide variety of audits (e.g., banks, railways, breweries, etc.). The term was used in the first edition of Spicer and Pegler [1911, p. 29], but only first appeared in the ICAEW's Final Audit paper of 1929 [November, question 10].

The audit notebook did service at least into the 1960s [interview with Hardcastle], and, remarkably, the final edition of Dicksee (1969) continued the description of them which, with only one or two alterations, was the same given in the first edition of 1892 [Waldron, 1969, p. 36]. The same audit notebook could perform prolonged service. An accountant who trained with Thornton and Thornton in the 1950s recalled: "I looked at the audit programme and it went back ten years, and the previous audit programme went back another ten years" [interview with Haddleton]. Talking of the early 1960s, another auditor noted that, "the same programme was used no matter what firm you dealt with. We'd turn up in many a different factory and carry out the same sort of procedure" [interview with Chapman]. The divergence in the use of audit programs can be seen from our questionnaire evidence, illustrated in Figure 1, showing that from the interwar period through to the 1960s, only around 50-60% of audit firms were always or often using them.

Two further documentary elements which were to become more prominent later were also present in the bookkeeping audit. First, loose documentation was inevitably accumulated to some extent in the conduct of an audit and was carried forward from year to year. The first edition of de Paula [1914, pp. 12-13] suggested that, "all working papers should be filed and kept." Yet again, there was wide disparity of practice; some firms had no audit programs but good working papers and vice versa, while others had neither [interviews with Boothman and Denza]. By the 1940s, some major firms like Price Waterhouse had begun to systematize their working papers, a practice that increased after the war [interview with Duncan; de Paula, 1966, pp. 15-16; Waldron, 1969, p. 373; de Paula and Attwood, 1976, pp. 18-21, 268]. Second, an audit manual, in embryo at least, dating from perhaps the 1860s, is detailed in the first edition of Dicksee [1892, pp. 2-4] and gives a list of 22 general instructions starting with: "1. In commencing a new audit you should obtain a list of all the books kept and all the persons authorised to receive or pay money."

Testing: Accounting historians have tended to underestimate the amount of testing in early audits. Littleton [1981, p. 312], in his survey of lectures published in the *Accountant* in the 1880s, concluded that "very little of it was done." Lee [1988, p. xviii] also found that there was "little evidence of test checking prior to 1900." Indeed, in a legal judgment in 1885, it was declared to be the duty "of an auditor to check and verify by vouchers or otherwise *every item* before he passed it" [quoted in Chandler, 1997, p. 64]. The first edition of Pixley's [1881, p. 164] textbook laid down: "A thorough and efficient audit should embrace an examination of all the transactions of a Company"; this wording remained in the tenth edition [1910, p. 541].

But testing highlights the significance of the size of the client. With smaller companies, the auditor could check everything, while to vouch all transactions for large clients like the railways was impossible. Accordingly, test checking was a feature from the beginning of the professional audit. A speaker at an ICAEW meeting in 1888 stated: "I cannot see in many businesses how it is possible for the whole of the work to be audited; when one bears in mind… a bank like Coutts' at the West end of London… We must accept certain results, and only audit a part of the work" [quoted in Chandler and Edwards, 1994, p. 85]. Different parts of a business were to be looked at each year, or what became known as rotational testing [Chandler and Edwards, 1994, p. 87]. Dicksee [1892, pp. 8-9] stated in his first edition: "it cannot be denied that (except in concerns of comparative insignificance) a minute scrutiny of every item would be quite impossible to the Auditor… The accuracy of the accounts may be verified by tests which render the checking of every posting unnecessary." The first edition of Spicer and Pegler [1911, p. 22] discussed testing, and advised the auditor:

> … if discrepancies are found he should carry his examination further. If, on the other hand, the transactions he has examined are in order, he is entitled to assume that the remainder can be safely passed…. The vouchers should be tested exhaustively, either by taking a certain consecutive period, or by examining all vouchers over a certain amount.

These are descriptions of what became known respectively as "block" (i.e., "We took a month and checked everything;" [interview with Evans]), and "stratified" testing [Spicer and Pegler, 1914, pp. 56, 72]. Also, the second edition of Spicer and Pegler [1914, p. 99] described testing by "taking individual accounts in different ledgers," indicating that, although not named as such, "depth testing" or "walk-through testing" was also in early use.

Power [1992] has argued that the early audit "tests" should be distinguished from later "sampling," a word first used in the 1933 edition of Dicksee, since the former did not incorporate the concept of "representativeness." Representativeness as a component of sampling, Power maintained, developed in the statistics discipline in the 1920s, unconnected with auditing. In practice, however, the distinction between testing and sampling would seem to be mere semantics since it is clear that early auditors were undertaking random tests on the understanding that they were to be taken as representative of the whole. If mistakes were found during a block test, that was indicative of a general weakness which necessitated further investigation [interview with Keel].

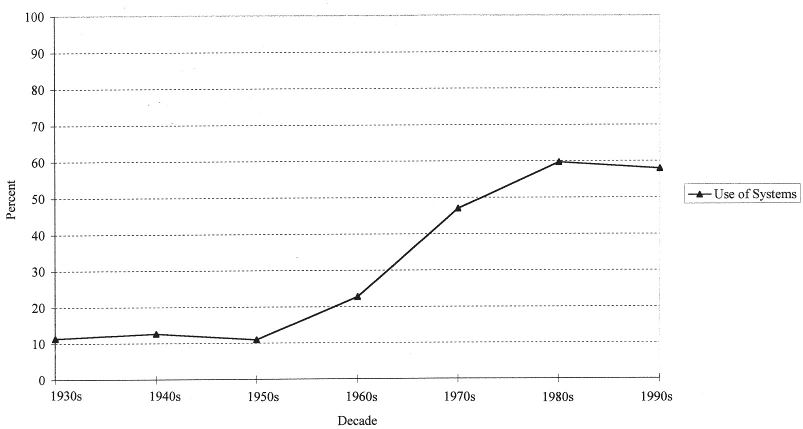
Internal Check: The so-called systems approach, at least in the form of auditing the internal check, can also trace its origins back to the earliest professional audits. In their preface to *Audit Programmes*, Spicer and Pegler [1910, n.p.] detailed what this involved:

> It will be observed that the suggestion that the Auditor should ascertain the system of internal check in operation has been repeatedly made. This phrase indicates some system of account-keeping and the checking thereof by the staff of the business, so arranged, that collusion between two or more persons becomes necessary before fraud can remain undetected for any length of time.…The practical importance to the auditor of an exact knowledge of any system in operation is unquestionable, as in all large audits the work to be done by the Auditor will be in direct relation to the system of internal check employed.

Again, the auditing of the client's system has tended to be overlooked by historians. Lee [1972, p. 150], for example, states that it "was first generally recognised as a feasible approach to the function [auditing] in the 1920s and 1930s." However, even in 1888, an auditor asserted: "Take the case of railway companies. We cannot there deal with details; we must be content with the internal audit, and to a great extent merely satisfy ourselves as far as we can as to the results" [quoted in Chandler and Edwards, 1994, p. 87]. The first edition of Dicksee [1892, p. 40] also noted that "a proper system of internal check frequently obviates the necessity of a detailed audit." The first edition of Spicer and

FIGURE 5

Use of Systems Approach



Source: Postal questionnaire, see text.
Notes: The graph represents the percentage of respondents who replied that they "always" or "often" used the systems approach during their training, respondents being grouped into the decade in which they trained.

Pegler [1911, pp. 6-7] also put a heavy emphasis on assessing and then relying on the internal check. Figure 5 shows that in the early decades just over 10% of auditors said they audited the client's internal control systems always or often. An interviewed auditor of quoted companies in the 1930s described how: "If the company's own controls were strong then the sampling would be limited. If they were weak, then the sampling was much more extended" [interview with Keel].

Management Letters: From the beginning, auditors commented to management on any weaknesses found in the internal controls. The management letter proper emanated from America where auditors, often called "the profession of business advice," from early on apparently had to make themselves useful to their clients [Montgomery, 1912, p. 7]. In Britain too, as Figure 6 shows, approximately 10% of firms from the interwar period through the 1950s always or often sent out management letters. One auditor remembered: "We did that in 1934…It was a letter that went out with the final accounts and the audit report. It might say: 'We think that your recording of petty cash is rather loose…'" [interview with Passmore].

Contrasts with American Practice: The argument so far therefore is that the nature and diversity of the early British bookkeeping

FIGURE 6

Use of Management Letters

Source: Postal questionnaire, see text.
Notes: The graph represents the percentage of respondents who replied that they "always" or "often" used management letters during their training, respondents being grouped into the decade in which they trained.

audit was largely determined by the size and variety of the clients. This view can be confirmed by comparison with American practice in this period.

As is well known, British auditors carried their brand of bookkeeping audits to the U.S. in the 1880s, which the Americans soon abandoned [Anyon, 1974, p. 9; Parker, 1986, p. 66; Miranti, 1990, p. 29; Previts and Merino, 1998, pp. 128, 134-135]. The first edition of the leading U.S. audit textbook [Montgomery, 1912, pp. 8-10] favored the more progressive "balance sheet audit" which by the 1930s at least already involved testing of the client's systems using internal control questionnaires (ICQs) [Myers, 1985, p. 63]. By 1932, an informed observer could claim that "the US profession had progressed to higher standards than those obtaining in Britain" [Edwards, 1976, p. 302].

Moyer [1988, p. 128] argued that since American companies had no legal obligation to be audited, the auditors had to make themselves useful and to keep down costs by the use of sampling and appraising control systems. It was also argued that bank finance, which was the rule in the U.S., strongly fostered "balance sheet audits" which assessed the client's ability to repay loans [Littleton, 1988, pp. 24-25, 31]. However, the weakness with the argument is that once stock market finance became significant in the 1920s and the 1934 Securities and Exchange Act made the audit compulsory for listed companies in America, practice still continued to diverge significantly from the British [Montgomery et al., 1949, p. 5; Chatfield, 1977, pp. 132-133; Cochrane, 1979, p. 178; Zeff, 1979, p. 209; Tricker, 1982, p. 55; Michie, 1987, pp. 34, 169, 197, 264, 272; Previts and Merino, 1998, pp. 249-251].

The main reason for the transatlantic differences in audits, therefore, was probably that American clients have always been on average larger than the British [Lee, 1972, p. 24; Lee and Parker, 1979, p. 161; Chandler et al., 1993, p. 456]. For example, whereas in 1903, U.S. Steel, the largest industrial employer in America, had 168,127 workers, the largest U.K. equivalent, Fine Cotton Spinners & Doublers, had approximately 30,000 workers [Schmitz, 1993, p. 23; Wardley, 1999, p. 107]. As a result of their size, Chandler [1962, 1977, 1990] has shown that U.S. companies were professionally managed and even had sophisticated accounting departments and internal audits by the 1870s [Montgomery et al., 1949, p. 53]. The size and professionalism of their clients therefore explains why American auditors led in the use of sampling and the systems approach. Also, since they were far more likely than the British to be presented with a finished set of accounts, the need was obviated to attend to the arithmetic accuracy of the bookkeeping, allowing American auditors to focus on the balance sheet.

AUDIT CHANGES FROM THE 1960s TO 1980

Causes of Change: As our questionnaire data, graphed in the figures, and our interviews with those working at the time show, auditing in Britain was transformed in the 1960s and 1970s. What caused this change?

A number of factors which might have had an impact on audit techniques do not appear to have done so. Statute law was not a major influence. The Companies Acts laid down the duties of the auditor but never made any stipulation as to how the audit should be conducted [Bigg, 1951, pp. 213-214, 276, 303; de Paula and Attwood, 1976, pp. 251-252; Woolf, 1997, pp. 288-289, chap. 9]. Although many legal judgments set out to some extent what was expected of the auditor, they seldom went into how to accomplish the task. Similarly, recent issues of state regulation or corporate governance post-Cadbury [1992], although concerned with audit quality, did not venture into how auditing should be practiced.

Nor did professional regulating organizations tell their members how to audit. Even recent auditing standards have failed to initiate process change, and were, according to Woolf

[1997, pp. 16, 18-19], merely "the codification of contemporary audit practice and procedures…[and] indicators of best practice," although they perhaps hastened diffusion from larger to smaller firms [Edwards, 1989, p. 212; ICAEW, 2000, pp. 5-7].

To what extent did American practice influence the British? Without exception, changes in British auditing techniques and nomenclature over the last hundred years came to prominence first in America. These make a formidable list: working papers, sampling, statistical sampling, the balance sheet audit, internal control, ICQs, flow charts, attendance at stock-taking, circularization of debtors, management letters, materiality, risk assessment, and analytical review. However, although British firms had to adopt American audit practices when auditing American subsidiaries in Britain, for example, attendance at stock-takes and the circularization of debtors, which had been imposed on American auditors following the 1939 McKesson and Robbins fraud case, the timing of the transformation of the British audit in the 1960s seems to have owed little to transatlantic influence since it came long after the changes had been made in the U.S. [*Accountant*, June 24, 1939, p. 851, August 16, 1941, pp. 85-86; Chatfield, 1977, pp. 135-137; Cochrane, 1979, p. 178; Baxter, 1999, pp. 157-174].

Of greater impact on the auditing process in Britain was the fact that from the 1950s, labor was becoming much more expensive for accountancy firms. Traditionally, articled clerks received no salary during their training. Rather, they paid a premium, typically £500 (£10,650 at 2005 prices) in 1950, for the privilege of being trained [Matthews and Pirie, 2001, pp. 401-402]. This free labor meant there were few time pressures on the bookkeeping audit so it could afford to be detailed [interviews with Engel, Evans, and Venning]. However, by the 1950s, the demand for accountant recruits was outstripping the supply of suitable candidates. Our questionnaire evidence indicates that whereas 88% of respondents paid a premium in the interwar period, only 30% did so by the 1950s, the last being in 1958. Increasingly, firms had to offer attractive salaries to their trainees. One factor was that, whereas in the 1950s only 8.6% of respondents to our questionnaires had gone to university, by the 1980s the figure was 87.5%. Chartered accountancy had largely become an all graduate profession. By 1967, Cooper Brothers was offering £850 (£9,600 at 2005 prices) as a starting salary for an articled clerk, and Peat Marwick Mitchell, £800 (£9,020).[1] The figure to-

[1]I am grateful to Professor J.R. Edwards for these data.

day is around £20,000 [Hays, www.hays.com/accountancy]. This escalation in the cost of audit labor meant that, regardless of the other factors at work, the "check everything" audit was doomed as too expensive.

The most important factor driving change in the audit in the 1960s, however, was probably company size. We argued above that the main determinant of the character of British audits in the 19th and first half of the 20th century was the size and professionalism of the clients. The significance of this factor is borne out by the additional questionnaire data set out in Table 2. As can be seen, "progressive" practices were always more likely where the respondents mainly audited quoted companies and, to a lesser extent, where their training was mainly in the larger audit firms. Moreover, since the size of clients determined the size of audit firms and not the reverse, client size is revealed as the primary determinant of audit practice.

The importance of client size on changes in audit technique, of course, is that British companies were growing rapidly in scale, particularly in the 1950s and 1960s period. The tenth, 25th, and 50th largest employers in Britain approximately trebled in size between 1935-1970, growth being most rapid in the 1955-1970 period [Jeremy, 1991]. The share of the largest one hundred manufacturing companies in total net output increased from 22% in 1948 to peak at 41% in 1978, entirely due, according to Hannah [1983, pp. 144, 180], to the merger movement among companies, at its height in the 1960s. As a result of this trend, family control of the one hundred biggest manufacturers declined from 54% in 1950 to 30% in 1970. British companies were also becoming more multinational and diversified [Channon, 1973, pp. 24, 60, 67, 75, 78]. With the increased scale and complexity of British companies and the decline of family control came the introduction of more professional management. It was now cheaper for companies to employ their own accountants than to use the auditors to do their accounting. Consequently, the number of qualified accountants working in industry increased over five-fold from 1951 to 1991 [Matthews et al., 1998, p. 215; interview with Hewitt].

The importance of the increase in the scale of clients on audit practice is attested to in many of our interviews. Typical was the following response: "From 1946 to 1966, everything went up in scale. …You had on the one side businesses merging, integrating, taking over, consolidating and on the other side you had the profession struggling to keep the lid on. …You couldn't carry on casting all the books yourself" [interview with Jones]. In the following sub-sections, we detail the impact of the growing size of audit clients on how the British audit was conducted.

The Decline in the Accountancy Function and the Rise of the Balance Sheet: The growing professionalism of the typical client meant, as Figure 2 illustrates, the decline in the accounting role of the auditors and the increasing predominance of the pure audit. This development provided both a challenge and an opportunity for British auditors. It was a problem in that when the audit also involved making up the accounts, clients could see they were getting something for their money. Now, as this unofficial accounting role of the auditor disappeared, clients were increasingly likely to view the audit as a "damn nuisance," which probably accounts for the growing need for British auditors to make themselves more useful to the client, manifested in part by the management letter [interview with Aspell; Humphrey and Moizer, 1990, pp. 231-232; Woolf, 1997, p. 144]. On the other hand, the reduction of accountancy work gave British auditors the opportunity to shift the focus of the audit to the balance sheet as in America.

This trend was also encouraged by the growth in scale and complexity of the client, which meant that the auditor could undertake proportionately less checking of transactions, relying more for audit assurance on verifying balance sheet items. Also, largely due to company mergers and increased size, there was a greater reliance among British companies on funding via the stock market. Between the late 1940s and early 1970s, domestic capital raised on the London Stock Exchange increased ten-fold in real terms [Wilson, 1995, pp. 189-190]. Consequently, investors, particularly the institutions, which held 60% of equities by the 1970s [Wilson, 1955, p. 191], together with investment analysts and the financial press, increased interest in issues of corporate profitability and solvency, again putting focus on the balance sheet and the verification of assets and liabilities [Lee, 1972, pp. 87-88; Woolf, 1997, p. 192; interview with Tweedie].

The impact of these factors can be measured by the changing audit practice with respect to inventory and debt. Through the 1950s, the trade press, textbooks, and the ICAEW itself increasingly urged attendance at stock-taking [*Accountant*, September 21, 1957, p. 346, November 2, 1957, p. 509; de Paula, 1957, p. 126; Waldron, 1969, p. 175, 1978, p. 186]. By 1969, the ICAEW Statement on Auditing (No. 11) stated: "In most circumstances attendance was the best method of stock verification" [*Accountant*, April 19, 1969, p. 550]. As Figure 3 shows, the practice grew rapidly in the 1960s and 1970s to the point that by the 1980s, attendance had become almost universal, with growth levelling off in the 1990s. Stock is a far more prominent feature of the audit today than it was in the bookkeeping days. Now, because of its impact on the profit figure, the textbooks call stock the "*key* item in accounts." It was for the auditor "the one that must be singled out for special attention" [Woolf, 1997, p. 191; Millichamp, 2002, p. 184; interview with Tweedie]. Chan et al.'s [1993, p. 768] interviews with partners in the Big Six firms in the early 1990s indicated that with some clients, the effort spent in auditing inventories could take as much as 25% of audit time.

Similarly, circularization of debtors was still "not a widespread practice" in the late 1950s [*Accountant*, August 2, 1958, p. 132], and the Coopers manual [1966, pp. 267-268] claimed it "is not usually carried out." Debtor circularization was first explicitly mentioned in an ICAEW Final Audit examination paper in 1965 [November, question 5]. However, Figure 4 on debtor confirmations shows a similar trend to Figure 3 – less than 10% of firms in the interwar period carried them out, with a rapid increase in the practice to almost 80% in the 1980s. Our interviews confirm this pattern [interviews with Fabes, Patient, Whinney, and Wilde].

A rider must be added, however, to the trends detailed above. As can also be seen from Figure 2, a quarter of our questionnaire respondents stated that they frequently also drew up their clients' accounts, even in the 1990s. Although for those auditing quoted companies this practice had all but disappeared, there remained a large constituency of smaller clients where the auditors still "do the books," and where elements of the old bookkeeping audit are still very much alive. However, frequently the main concern with small companies is minimizing tax, where stock valuation is vital, which could explain, as Table 2 reveals, why apart from the use of audit programs, attendance at stock-taking was the most used of the "progressive" audit techniques with smaller clients.

Documentation: The increased size of audit clients also prompted an increase in planning the audit and greater use of documentation. The bigger the job, the greater the imperative to think about the timing and organization of audit work, as well as the need for firms to control the larger numbers of staff. As can be seen from Figure 1, there was a significant increase in the 1970s in the use of audit programs. Maintaining working papers on audits of any size also became the rule, and the disparity of practice between firms as in the other techniques was much reduced [interviews with Boothman, Denza, and Duncan].

Another significant change in audit documentation in this period, also prompted by the growing scale of audits, was the increased use of audit manuals. Although a number of firms (e.g., Thornton and Thornton) [interview with Haddleton)] had by the 1950s expanded on the brief general instructions we noted were sometimes used in Victorian times, none matched the Cooper Brothers manual, apparently written by the head of the firm, Henry Benson, and first issued to staff in 1946 [Benson, 1989]. The purpose of the manual was again labor control: "Their big worry was keeping control of the staff. There were huge numbers of people, they didn't know what they were getting up to, they were scared out of their wits and this was the origin of the audit manuals" [interview with Goodwin]. Eventually published in 1966, the 620-page manual based the firm's audit procedures on formal documentation with a heavy reliance on the client's internal controls [Cooper, 1966, p. vii; *C&L Journal,* No. 31, June 1979, p. 15].

The Coopers manual was highly influential on auditing practice both before and after its publication [interviews with Atkins, Hewitt, and Middleton], and spurred other firms into either adopting it or producing their own as did Price Waterhouse, for example, in 1969. Most firms of any size had manuals by the early 1970s [interviews with Patient and Stacy]. However, Humphrey and Moizer [1990, pp. 225-226, 228] found from their interviews with 18 audit managers that while the audit manual was still used for its original purpose of controlling staff, they were "merely establishing a loose framework in which expert audit judgement could be exercised."

Statistical Sampling: The increased size of audit clients also meant the need for greater reliance on testing. As one interviewee [Livesey] put it: "No longer could you pretend to tick everything. So we did begin to think about systems and look at sampling." By the 1970s, there was also greater technical sophistication in the form of so-called statistical sampling, taking random samples and applying the laws of probability to the number of errors found in order to extrapolate to an estimate of errors in the whole population. Although a brief article on probability and the audit, which acknowledged no American influence, appeared in the *Accountant* [October 8, 1932, p. 444] in the early 1930s, the Americans made the early running, dating from an article in the *American Accountant* in 1933 by Lewis Carman

[*Accountant*, November 15, 1958, p. 605]. Moreover, the use of the word "sampling" in the audit context was also of U.S. origin. An American academic, L.L. Vance, a leading popularizer in the 1940s and 1950s and a professor of statistics at Princeton University, collaborated with the U.S. firm of Haskins & Sells in developing a precursor to monetary unit sampling, first published in 1972 [McRae, 1982, pp. 143, 152]. The practical application of statistics by American auditors, however, was slow. Of the leading U.S. auditors surveyed in 1979, only 45% said they used statistical sampling and only 13% stated they had started doing so before 1970 [McRae, 1982, p. 181].

FIGURE 7

Use of Statistical Sampling Techniques

Source: Postal questionnaire, see text.
Notes: The graph represents the percentage of respondents who replied that they "always" or "often" used statistical sampling techniques during their training, respondents being grouped into the decade in which they trained.

As can be seen from Figure 7, statistical sampling gained in usage in Britain in the 1970s. Here, however, the figures must be treated with caution since the 10% of our respondents who stated that they used statistical sampling in the 1930s and 1940s, when asked for the methods used, indicated that they were in fact referring to basic block testing. However, younger respondents indicated they were referring to statistical sampling as defined above, and Figure 7 shows a clear upward trend in its use from the 1960s to the 1970s. The first question on statistical sampling in an ICAEW examination paper appeared in the Final Audit paper of 1971 [November, question 1]. By the 1970s, all the textbooks, while previously more or less silent on the issue, were devoting chapters or significant sections to the technique [Lee, 1972, pp. 47, 169-171; Waldron, 1978, p. 404]. The upward trend in the use of statistics in auditing in the 1970s is also confirmed in our interviews, also significantly suggesting that their rise was largely dependent upon the advent of computers, which greatly facilitated the selection and retrieval of samples [McRae, 1982, p. 14; interviews with Brindle, Colvin, Milne, and Niddrie].

Power [1992, p. 58] has argued that statistical sampling was adopted as "less an explicit technology and more as playing a role for members of the profession by positioning them as credible monitoring agents on behalf of capital." Again Power's view cannot be accepted. Statistical sampling as a public relations exercise would not explain why firms that adopted it made no particular attempt to broadcast the fact, nor why many in the audit profession resisted its introduction on the grounds that it was a flawed methodology being foisted on the profession by academics [*Accountant*, May 16, 1964, pp. 631-632]. Firms like Arthur Andersen and Cooper Brothers apparently never used the technique to any extent [interviews with Middleton and Plaitowe]. The technical objections to statistics were that financial transactions are not homogenous and are therefore less susceptible to the laws of probability. There was also a perceived need for large sample sizes and a corresponding increase in costs [*Accountancy*, June 1977, p. 121; McRae, 1982, p. 297; Sherer and Kent, 1983, p. 68; interviews with Carty and Currie].

There is also evidence that statistics were only partially used. Turley and Cooper [1991, p. 111; see also, Higson, 1997, p. 211] reported: "Many of these methods are…often weak on the evaluation of sample test results." The written replies to our postal questionnaire also give the impression that statistics were used more for the selection of samples than for the analysis of the results. One audit manager told Humphreys and Moizer [1990, pp. 227-228] that they found "it difficult to statistically extrapolate our results so we tend to have to use judgement always."

Internal Controls: A growing reliance on the systems approach was probably the major result of the growth of the scale and professionalism of audit clients. The increased size of clients meant that the auditors could not hope to use (substantive) tests on as high a proportion of actual transactions as they had done. But, happily, the concomitant increase in the professionalism of British management meant that they increasingly had financial and organizational systems and internal audits which went well beyond the internal checks of the earlier era (although the segregation of staff duties remained part of internal controls). These the auditor could now use for audit assurance, questioning the systems with ICQs, illustrated in flow charts and checked by in-depth compliance testing [Millichamp, 2002, p. 86].

As we have said, the Coopers manual placed a major emphasis on checking internal controls and the firm practiced the procedure on their largest clients, like Unilever, in the 1950s [*Accountant*, October 26, 1957, pp. 474-475; Cooper, 1966, pp. 1, 11, 15, 361-457]. But Coopers was almost certainly in the vanguard [*Accountant*, May 20, 1967, pp. 658-665; interviews with Heywood and Middleton]. Despite the fact that as early as 1961, the ICAEW's statement U1 had stressed the need for the depth testing of internal controls, even in the 1960s, articles in the trade press indicated that the practice was not that common [*Accountant*, December 2, 1961, pp. 718-719, May 18, 1963, p. 645, November 2, 1963, p. 573]. Figure 5 shows that still less than a quarter of trainees always or often used the systems approach in the 1960s. Indeed, the term "internal control questionnaire" did not appear in the ICAEW Final Audit paper until 1970 [November, question 2]. By the 1970s, however, all the textbooks were alerting their readers to the rise of the systems approach [de Paula and Attwood, 1976, pp. ix, 17; Waldron, 1978, pp. 33-63, 91]. The first edition of Woolf [1978a] put it at the heart of the audit function, usually conducted in interim work prior to the year-end. Figure 5 shows that by the 1980s, 60% of respondents to our questionnaire said they always or often used the systems approach.

Management Letters: As noted above, along with the systems approach went the management letter, initially used to point out any weaknesses found in the client's controls. Figure 6 demonstrates how increasingly in the 1960s, British firms took up the practice. Management letters became the general rule from the 1970s, coinciding with the rise of the internal control audits. In the 1960s, however, the management letter also moved beyond mere comments on the client's control weaknesses into offering general advice to "help the company to become a better company" [interview with Grenside; *Accountant*, August 27, 1966, p. 257; Coopers & Lybrand, 1981, p. 116]. Lee [1972, pp. 40-41] argued that auditors should comment on where "the auditor feels there could be increased efficiency and profitability." But the standard textbooks were slow to acknowledge the management letter, perhaps because of a reluctance to discuss commercial aspects of the audit not part of the statutory obligation of the auditor [de Paula and Attwood, 1976, p. 25; Waldron, 1978, p. 120; Woolf, 1978a, p. 145; Gray and Manson, 1989].

COMPUTING AND THE AUDIT

Our interviews and the questionnaire results suggest that auditors themselves felt that the greatest single change in the way the audit was conducted in their careers was brought about by the technological revolution embodied in the electronic computer. Indeed, the work of auditing largely went from ticking ledgers to clicking a computer mouse.

Computers had been preceded in the interwar period by mechanical processors. Principal among these was the comptometer, which took the drudgery out of casting and was first used widely in Britain in the 1920s. Punched card machines, ideal for processing information from invoices, statements, wages, or stock records, could produce a trial balance by 1925 [*Accountant*, February 2, 1924, p. 177, September 12, 1925, pp. 403-462, February 3, 1929, p. 133, August 7, 1937, p. 198; Bigg and Perrins, 1971, chap. XI; Campbell-Kelly, 1989, pp. 7-8, 1992, p. 130, 1994, p. 71; Jones, 1995, p. 166, plate 58]. With continual improvements in performance, these machines remained the most common office data processors until the 1970s [Campbell-Kelly, 1989].

These mechanical processors had some impact on the audit, but they did not pose the same problems for the auditor as the computer [*Accountant*, March 20, 1937, pp. 418-419]. Stoneman [1976, pp. 20, 183] has estimated there were 12 electronic computers installed in the U.K. by 1954, 306 by 1960, 1,424 by 1965, 5,470 by 1970, and 10,983 by 1975. It was only in the late 1960s, therefore, that computers became a significant factor in auditing. In the 1970s, they were still the large, unreliable, relatively weak, and expensive mainframes which only sizeable clients could afford [McRae, 1977, p. 120]. The next major landmark was the personal computer, developed simultaneously by the American companies, Apple and IBM, in 1979-1980. Compact enough to sit on the desktop of the smallest audit client, PCs were rapidly taken up in the 1980s and 1990s, and by the turn of the century, over 500 million had been sold worldwide [Carr, 1985, p. 36; *Observer*, August 12, 2001]. With far greater storage, calculating power, and reliability, PCs had an impact on accounting and auditing even greater than the mainframes.

The main debate initially within the profession was whether to audit "through" or "around" the computer. To begin with, out of a necessity born of ignorance, the latter approach, which "relies on verifying input and output and on reconciling the two…without investigating too closely the actual processing patterns of the computer" was the preferred procedure [Gwilliam, 1987, p. 308; interview with Niddrie]. But the increase in computer speeds in the 1970s meant that preserving the audit trail with print-outs became uneconomical, and audit around was increasingly challenged by the audit through approach (i.e., checking the computer's own processing) [Gwilliam, 1987, pp. 308-309; Woolf, 1997, p. 341]. The advocates of audit through seemed to gain the upper hand in the late 1960s. Pinkney [1966, p. 14, chaps. 3-6] urged the use of test packs, putting trial data through the system, and running the auditor's own programs in the client's computer. These procedures were again American in origin and were introduced into Britain from the late 1960s [*Accountant*, September 3, 1966, p. 37, January 25, 1969, pp. 345-346]. A survey of 64 British accounting firms in 1981 found that 22 said they had little or no involvement with computers. Of the rest, including 12 out of the top 15 firms, 85% said they checked that the system specification was in line with the client's documentation; 61% used test packs; 56% used their own audit programs; and 72% used off-the-shelf packages [*Accountancy*, October 1981, p. 68].

However, there are strong suggestions that audit through did not triumph completely. Pound found in 1978 that audit around was still used in practice [Gwilliam, 1987, p. 308]. In 1982, Gwilliam and Macve, based on talks to researchers in eight international accounting firms, concluded: "Some firms consider … a perfectly satisfactory audit can be carried out 'around' the computer" [*Accountancy*, November 1982, p. 121]. Also, Turley and Cooper [1991, p. 37] still found poor computer literacy generally among audit staffs and problems with the compatibility between the systems of the client and those of the auditor. Higson [1997, p. 205] confirmed that even in the 1990s, audit around was very much alive and kicking.

The IT revolution also had an impact on other audit techniques – what students of technological change in manufacturing call "spin-off" [e.g., Trebilcock, 1969]. One such effect was that it became easier for clients to do their own accounting, particularly with the arrival of PCs, so that computers can be counted as another factor in reducing the accounting role of the auditor. Second, the fact that computers are more difficult to check and interrogate than manual systems reinforced the change in audit emphasis towards assessing the client's own internal controls. Third, computers also reduced the need for arithmetic precision by the auditor; indeed, it abolished the old skill of casting columns of figures. Finally, as we noted earlier, the growing popularity of statistical sampling from the 1970s owed a great deal to the spread in the use of computers.

CHANGES IN THE AUDIT FROM 1980 TO THE PRESENT

Growing Commercial Pressures: Apart from the exogenous upheaval of the computers, we have so far explained the main changes in audit techniques as principally due to the increased size of the client. However, by the 1980s, the steam had gone out of the growth in British companies; the share of the largest one hundred manufacturing companies in total net output, for example, fell from 41.0% in 1978 to 37.5% in 1990 [Hannah, 1983, p. 180; *Business Monitor: Report on the Census of Production,* 1990]. From 1980, the major force for audit change became cost and other commercial pressures. The increasing cost of audit labor noted above continued apace, but added to this supply-side consideration, there were also growing demand-side pressures. By the late 1970s, as a result of tariff reductions and the whole process we now call globalization, British companies had become increasingly exposed to foreign competition. During the world depressions of the early 1980s and early 1990s, with clients desperately needing to cut overheads, audit fees were an obvious target [Griffiths and Wall, 1997, p. 659; interview with Heywood]. Companies began for the first time putting their audits out to competitive tender and switching auditors to secure the best deal. In the early 1990s, audit firms competed among themselves for business by cutting fees or "low-balling" [*Accountancy,* February 1978, p. 10; *Accountancy Age,* April 14, 1994, p. 2; interview with Grenside].

The wider economic pressures on clients has meant that, since the late 1970s, audit firms have had to cut their costs, which has had a major impact on audit processes. As one of our interviewees [Engel] characterized it, firms became "much more conscious of the time spent … much more cost conscious." "One had to start thinking: 'Well we did three months last year; can't we get away with a month'" [interview with Venning]? Gwilliam [1987, p. 418] explained: "An underlying motive for improved efficiency has been increased price or fee competition in the market for auditing services." As Turley and Cooper [1991, p. 34] put it, the "overwhelming" influence affecting audit procedure in the late 1980s was "'fee pressure' and the need for cost effectiveness and efficiency." A typical interviewee of Turley and Cooper [1991, p. 35] observed, "the key emphasis is on collecting the minimum amount of evidence we need to support an audit opinion." An auditor interviewed by Higson [1997, p. 210] thought "the whole thing is about reducing substantive testing – justifiably" [see also, Humphrey and Moizer, 1990, p. 230; Manson, 1997, pp. 234-235; interviews with Carty and Kemp].

Decline in Some Techniques: In general then, most of the techniques we discussed above as growing in popularity since the 1960s and which became the mainstay of auditing, principally the systems approach and statistical sampling, had their cost effectiveness increasingly called into question in the late 1970s. Our evidence, however, indicates that the decline in some techniques has to some extent been overstated. Turley and Cooper [1991, pp. 14-15] thought that the systems approach as practiced in the 1980s led to what was called "over-auditing" and "resulted in a large volume of flowcharting, evaluation of systems and testing, much of which was not well focused or necessary." Therefore, they argued that when costs needed to be cut, the technique was a prime candidate and a marked decline in its use followed. As Figure 5 shows, however, although there may have been a slight decline, and certainly no further growth of the technique in the 1990s, checking internal controls remained a very common audit procedure.

Based on the weaknesses discussed above and the skepticism of some firms, there was also a distinct cooling of enthusiasm for statistical sampling in the 1980s and 1990s. A number of interviews with senior audit practitioners induced Higson [1997, p. 211] to take an extreme view, concluding: "Now with most firms there is little pretence at a statistical approach to auditing … the auditor 'may not do any tests of detail in many cases' … increasingly 'sampling is a test of last resort'." This apparent wholesale retreat from statistics in auditing does not, however, accord with our questionnaire evidence. Figure 7 shows that the diffusion of statistical sampling slowed in the 1990s, but there is no evidence of a decline in its use. Moreover, the traditional substantive testing methods using the auditor's judgment as discussed above remained popular [Woolf, 1997, p. 131; Porter et al., 2003, p. 231].

Our questionnaire data illustrated in the graphs also indicate a decline in the growth in usage of audit programs, management letters, and attendance at stock-taking in the 1990s.

Figure 4, in fact, reveals a marked absolute decline in the use of third-party confirmations in the 1990s. Circularizing debtors was increasingly seen as cost-ineffective since the response rate was always poor and got worse as would-be respondents themselves came under cost constraints [interview with Spens; Woolf, 1978a, p. 177; Attwood and Stein, 1986, p. 217].

The Rise of Risk Assessment: A number of writers, including Turley and Cooper [1991] and Higson [1997], have argued that cost pressures and the decline of the systems approach were replaced by a greater reliance on the assessment of risk and analytical review, relatively cheap processes. Of course, the idea that some clients and some areas of the client's business carried a greater risk of things going wrong and, therefore, should attract greater audit attention was as old as auditing itself, implicit in Pixley's oft-quoted principle, enunciated in the 1880s, that, "the auditor must be entirely guided by his experience as to what he can take for granted, in fact, anything he does take for granted is at his own peril" [quoted in Chandler and Edwards, 1994, p. 155]. But risk and materiality as explicit concepts appeared first in America, at least by the 1949 edition of *Montgomery's Auditing*, which noted: "In the performance of field work the auditor must keep in mind the elements of materiality and relative risk. The exercise of due care implies greater attention to the more important items in the financial statements than to those of less importance" [Montgomery et al., 1949, p. 13].

However, not until the late 1970s, was the concept of risk established as a conscious focus of the British audit. Although journal articles in the early 1970s discussed risk and materiality [e.g., *Accountancy*, April 1972, pp. 18-20, October 1973, pp. 17-22], and Lee [1972, p. 168] noted: "The less confidence he [the auditor] has about the system, etc., the greater will be the degree of risk he will be undertaking by not verifying every transaction," none of the other textbooks of the 1970s, including Woolf's first edition in 1978, mentions risk as a factor in the audit. Indeed, the various editions of Woolf's booklet, *Current Auditing Developments*, probably allow us to date the rise of risk assessment as an audit "technique" since the first edition, published in 1978, contained no mention of the concept, while the third edition in 1982 had a whole section devoted to it [Woolf, 1983, p. 93]. The first ICAEW examination question explicitly dealing with areas of risk appeared in the 1981 Final Audit paper [December, question 1]. Our interviews also indicate that the notion of risk rapidly assumed popularity in the early 1980s and came to carry a heavy burden in the overall audit methodology. The head of Arthur Andersen went so far as to say in the late 1990s: "all the business now is about risk assessment" [interview with Currie; also Carty].

Attempts were also made to use statistical techniques to assess risk. Deloitte, Haskins & Sells and other firms were apparently using a statistically based risk model in 1982 [Gwilliam, 1987, p. 190], but generally statistics were little used in practice and most risk assessment was left to the auditor's judgment [Humphrey and Moizer, 1990, p. 225; Turley and Cooper, 1991, p. 61; Manson, 1997, p. 251]. Of course, since judgment is what auditors have always used, there is room for skepticism as to whether the vogue for risk assessment actually represents a change in audit technique.

Materiality: As with risk, auditors had used the concept of materiality informally from earliest times. It was implicit in stratified testing, and textbooks like Taylor and Perry [1931, p. 9] noted that test checking of large businesses could be "confined to more important matters." The first published usage in Britain came perhaps in an early ICAEW recommendation in the 1940s, which stated: "any change [in accounting principles] of a material nature … should be disclosed if its effect distorts the results" [Bigg, 1951, p. 285]. Firms like Coopers used the concept of materiality explicitly in the 1950s [interview with Denza; Cooper, 1966, p. 32], and in 1968, the ICAEW Council's statement on the "Interpretation of 'Material' in Relation to Accounts" was published [*Accountant*, July 27, 1968, pp. 116-117]. Even so, not until the 1978 edition of Spicer and Pegler, did a British textbook define the term. It is probably safe to say therefore that materiality as an explicit audit technique does not come fully into its own, along with risk and analytical review, until the 1980s [Waldron, 1978, p. 233].

The key issue with regard to materiality was how to determine, given the huge variation in the size and nature of clients, the monetary level at which an error becomes material. The textbooks offered formulae [Woolf, 1997, p. 169], but Lee [1984] found that out of 21 firms in the U.K. in 1984, seven had no materiality guidelines for their staff, and only ten provided specific quantified criteria for application in practice. As the Audit Practices Board's Statement of Auditing Standards on materiality in 1995 made clear: "Materiality is a subjective issue." According to Woolf [1997, pp. 168, 171], materiality guidelines were "unavoidably a matter for the audit partner's judgement," a quality auditors had used since the dawn of the professional audit.

Analytical Review: Alongside risk and materiality, the Americans led the way with the concept of analytical review. In 1950, a list of auditing methods drawn up by the American Institute of Accountants already included "analysis and review" [Myers, 1985, p. 53]. Yet again, it is also clear that analytical review, one definition of which is an "assessment of whether the figures in the accounts make sense" [Gwilliam, 1987, p. 419], had been an early tool of auditors in some form. Even in the 1890s, they looked at changes in the gross profit percentage and the stock/turnover ratio of their clients for signs of irregularities in the accounts [Chandler, 1996, p. 22]. Early railway accounts often gave the previous year's results alongside the current figures, allowing auditors to make comparisons [Midland Railway, half-yearly account, June 30, 1860; Arnold and Matthews, 2002, p. 8]. A leading Price Waterhouse partner indicated his firm was using its working papers for the purposes of analytical review in the 1950s [interview with Stacy]. The Coopers manual indicated the firm was computing data such as gross profit and stock and debts as a percentage of turnover, looking for anything that suggested "special circumstances explaining material variations in these figures" [Coopers, 1966, p. 19; interview with Livesey].

The vogue for the formal use of analytical review as a consciously specified technique, however, is of more recent provenance and was rapidly introduced at the same time as risk assessment. The first explicit use in Britain of the term "analytical review" was found in an article in 1979 on audit evidence [*Accountancy*, September 1979, p. 120]. By 1982, Gwilliam [1987, p. 13] reported that "firms generally are heavily committed to analytical review." Indeed, in that year, McRae, based on the audit manuals of five large firms, concluded that their audit procedures were basically similar: first, analytical review; second, procedural evaluation via sampling in depth and compliance sampling; third, substantive testing; and, finally, the evaluation of the results [McRae, 1982, pp. 36-41].

As with risk, predictive analytical models which used regression analysis (e.g., taking data from previous years to predict the current year's figures and identifying unexpected change) were available [McRae, 1982, p. 160]. Gwilliam [1987, p. 13], however, found: "The technique [regression analysis] was apparently much more used in the US, while in Britain even by the mid-1980s 'slow progress' was being made" [Gwilliam, 1987, pp. 419-420]. Only one firm had a model that could be described as in general use, while "in the great majority of audits subjective judgements (based on a variety of sources of evidence) have to be made" [Gwilliam, 1987, p. 193]. The Audit Practices Board's Statement on Auditing Standards on "analytical procedures" in 1995 made no mention of the use of regression analysis [Woolf, 1997, pp. 219-221], while Fraser et al. [1997, p. 42], in a survey of 700 audit partners, found that although 77% used analytical review, mainly at the conclusion of the audit, regression analysis "attracted little use in practice."

SUMMARY

Prior to the 1960s, the professional audit had altered little since its inception. This bookkeeping audit had a number of characteristic features. Relatively few audits in Britain, even down to the 1960s, were pure audits – the auditor being handed a complete set of accounts by management on which they gave an opinion. Although called an audit, the work in Britain typically also involved doing the client's accounting as well. Tasks included making up the books entirely, closing off the ledgers, casting the columns of figures and striking a trial balance, drawing up the final accounts, and then attesting to them as having been audited. The auditor could be required to pick up the job at any stage in this process, determined largely by the competence of the client's accounting staff, while, at the same time, auditing or checking the integrity of the figures. The typical bookkeeping audit then consisted of armies of articled clerks vouching transactions, checking postings, and casting columns of figures; with smaller clients, all the transactions were frequently checked. Most time in the bookkeeping audit was spent in this work; far less time was allocated to verifying items in the balance sheet where the word of management would frequently be taken as sufficient evidence. Moreover, so mechanical was the process that little thought went into planning the audit. Often no written program was followed or working papers kept, and little attention was paid to the nature of the client's business.

These features of the typical early audit are explained by the fact that British clients were commonly family firms with amateurish management who saw the auditors as primarily there to do the accounting which they were not capable of doing themselves. The importance of client size in determining the nature of the audit is confirmed by the fact that within the bookkeeping audit, there was a relatively wide diversity of practice. Larger clients did offer scope for the pure audit, and procedures that after 1960 were to become the norm, such as testing, checking the client's systems, focusing on the balance sheet, attending stock-taking, and even analytical review, were practiced in some form from the start of the professional audit. The importance of size would also explain why the Americans seemed to pioneer or at least to adopt these techniques before the British, since their audit clients were larger, with more professional managements.

There was, nonetheless, a general transformation in the conduct of the typical British audit in the 1960s and 1970s, driven, we have argued, largely by the decline of the family firm and the rise of the modern professionally managed business enterprise, by the related increase in external funding for companies, the needs of blind investors, and also by the increase in audit labor costs. These developments meant that, first, the practice of also doing the client's accounting declined. Second, the checking of accounting transactions was reduced, and substantive sampling increased, using, from the 1970s, statistical techniques. Third, audit evidence was also likely to come more from testing the client's own systems of internal control. Fourth, the focus of the audit investigation shifted from the profit and loss account to the balance sheet. Fifth, more work, particularly the testing of transactions and systems, was now likely to be conducted in interim audits during the financial year, leaving the year-end for balance sheet verifications. Sixth, more planning went into an audit, and the relatively strict following of audit programs and manuals and the keeping of working papers became almost universal. Seventh, accounting, as the unofficial aspect of the bookkeeping audit declined, it was replaced by the attempt to help the clients improve their businesses, embodied in the management letter. Finally, by far the biggest change in the audit process was the clients' use of computers from the 1960s on, which had spill-over effects in facilitating the use of statistical sampling.

Within one or two years around 1980, driven by the growing global competitive environment in which their clients found themselves, audit firms needed to adopt audit practices which cut costs and fees. As a result, the typical "systems" audit of the 1970s came under question and was to some extent superseded. Auditors spent more time before and after the gathering of audit evidence in a process known as analytical review, while the areas of focus in the audit were increasingly determined by risk assessment and guided by the concept of materiality. Audit investigation became directed at areas of the client's business deemed most prone to significant error. These post-1980 changes have usually been at the expense of the amount of testing of the accounting records and systems.

A number of further points should be made. As with the changes of the 1960s, strong elements of the apparent innovations of the 1980s had existed in some form since auditing began. Although analysis and risk assessment had the image of novel sophistication, they both relied heavily on the essential and age-old auditor's tool – judgment. Moreover, since there is no physically identifiable activity involved as, for example, in stock-taking attendance or circularization of debtors, there is doubt that the developments of the 1980s represent changes in audit technique at all.

Finally, our evidence shows that the more recent decline in some techniques, such as substantive sampling and the systems approach, has been exaggerated by some writers. Woolf [1997, p. 171] probably got it about right with his assessment of the relative importance of the auditor's practices in the 1990s as follows: "Internal control, if sound, may provide the auditor with one-third of the assurance sought; another third may be obtained from analytical review, assuming these show the draft accounts to be reasonable. The remaining third, in all cases, must be sought from substantive testing of transactions and balances." Therefore, aside from the largely exogenous but enormously important computer revolution, the causes of the changes in auditing techniques detailed in this article were basically economic and a function of the changes among the auditor's clients – the growth in their size before 1980 and the growing internationally competitive environment thereafter. The audit profession is, of course, part of the financial services sector, and, as might be expected of a service industry, the conduct of the audit process responded to the needs of the paymaster.

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